# Recent progress on the research of long-term evaluation of active faults and models of active-seismogenic faults

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Since the Kobe earthquake of 1995, the research on the active faults onshore Japanese islands has been intensely promoted by the Headquarters of Earthquake Research Promotion of the Japanese government. They selected the 98 active faults based on their potential to produce M7 class earthquake. Main target of this research was to reveal their paleo-seismic records, slip-rates and surface and subsurface geometry. Based on the length of estimated fault segments and amount of co-seismic slip, the potential magnitude is estimated using the empirical rule of Matsuda (1975). Risk for active faults is determined by paleoseismic records, mainly obtained by excavation surveys. Most of the basic research for the 98 active faults has been finished and preliminary evaluation will be completed with in the fiscal year of 2005. Through this research, large amount of paleoseismological data has been revealed. This decade was actually revolutionary periods for the research of active faults in Japan. The estimated probabilities in Japanese islands are great accomplishments. However, through this research basic problems are becoming clear, namely the problem of segmentation and grouping. Also, in spite of new technologies, such as geoslicer and geophysical subsurface imaging, to obtain paleoseismological records from blind faults is very difficult task. As another problems, typically shown in the 2003 Northern Miyagi earthquake, even through a smaller earthquake than M7 class produces sever damages. However, at this moment we have no technique to evaluate a risk for such active faults. In this talk, I would like to emphasize on significance of the modeling of source to active fault system. Based on seismic reflection profiling, examples of the images of deeper extension of active faults has been increased. Together with the geologic modeling based on the fault reactivation, to construct a realistic geometry model of seismogenic-active fault system is getting possible. Such model will provide the base for the more accurate estimation for strong ground motions. Recent progress on deep seismic reflection profiling has potential to detect the location of asperities on subduction mega-thrust based on their reflectivity, just it is shown in the deep seismic experiments beneath the Kanto basin. However, for the crustal active fault based on several experiments, the fault plane at depth in seismogenic zone commonly produce very weak reflection except for the deeper extension close to the bottom of seismogenic layer or below the seimogenic layer. The deep fault geometry commonly identified by discontinuity of the pattern of reflections. Therefore, to identify the location of asperities before rupturing of crustal fault is very difficult task for exploration seismology. The only possible way in present is the way of estimation based on the pattern of displacements along the surface traces and/or overall pattern of fault trace.